WHAT IS CLAIMED IS:

1. A color calibration method for an imaging color measurement device, comprising:

selecting an array of detectors of optical radiation;

selecting a plurality of optical elements designed to modify spectral power distribution of light incident on the array of detectors, such that a plurality of instances of irradiance of the array of detectors in a single measurement is resulted;

obtaining an error correction matrix for the imaging color measurement device for each instance of irradiance of the array of detectors in a single color measurement;

measuring a light source with known spectral output or chromaticity coordinates to obtain an irradiance response matrix of the imaging color measurement device for each instance of irradiation of the array of the detectors in a single color measurement;

applying the error correction matrix to the irradiance response matrix obtained by measuring the light source, so as to obtain a corrected irradiance response matrix for each instance of irradiation of the array of detectors in a single color measurement; and

calculating a color correction coefficient according to the known spectral output or chromaticity coordinate of the light source and the corrected response for each instance of irradiation of the array of detectors in a single color measurement.

2. The color calibration method according to claim 1, wherein the step of obtaining an error correction matrix of the imaging color measurement device for each instance of irradiation of the array of detectors in a single color measurement further comprises calculation of a flat-fielding

correction matrix by:

aiming the imaging color measurement device at a light source with a known radiance value matrix **L** to acquire an image for each instance of irradiation of the array of detectors in a single color measurement, wherein a response **M** for each image is obtained;

calculating the flat-fielding correction matrix **K** according to the equation of **M*K=L**, wherein each element of **L** is equal to each corresponding element of **M** multiplied by each corresponding element of **L**; wherein

each element of the flat-fielding correction matrix **K** represent an error correction factor of a corresponding light emitting area of the illuminant light source.

3. The color calibration method according to claim 1, wherein the step of selecting a plurality of optical elements designed to modify the spectral power distribution of light incident on the array of detectors includes selecting a set of optical filters designated to be used in conjunction with spectral response of a detector and imaging optics of the color calibration method to define a color space.

4. The color calibration method according to claim 1, wherein the step of selecting a plurality of optical elements designed to modify the spectral power distribution of light incident on the array of detectors includes selecting four filters, designated to be used in conjunction with the spectral response of the detector and imaging optics to match the tristimulus values X1, X2, Y and Z.

5. The color calibration method according to claim 4, wherein color correction coefficients C_{X1}, C_{x2}, C_Y, C_z for each of the filters X1, X2, Y and Z are calculated according to the equations of:

$$x_{CalibrationStandard} = \frac{C_{X1} * \overline{E}_{X1flat-fielded} + C_{X2} * \overline{E}_{X2flat-fielded}}{C_{X1} * \overline{E}_{flat-fielded} + C_{X2} * \overline{E}_{X2flat-fielded} + C_Y * \overline{E}_{Yflat-fielded} + C_Z * \overline{E}_{Zflat-fielded}}$$

$$y_{CalibrationStandard} = \frac{C_Y * \overline{E}_{Yflat-fielded}}{C_{X1} * \overline{E}_{X1flat-fielded} + C_{X2} * \overline{E}_{X2flat-fielded} + C_Y * \overline{E}_{Yflat-fielded} + C_Z * \overline{E}_{Zflat-fielded}}$$

$$C_{X1} * \overline{E}_{X1flat-fielded} + C_{X2} * \overline{E}_{X2flat-fielded} + C_Y * \overline{E}_{Yflat-fielded} + C_Z * E_{Zflat-fielded} = 1$$

$$\frac{C_{X1} * \overline{E}_{X1flat-fielded}}{C_{X2} * \overline{E}_{X2flat-fielded}} = known\ constant$$

wherein $x_{Calibration\ Standard}$ are $y_{Calibration\ Standard}$ the known chromaticity coordinates of the illuminant light source and $\overline{E}_{X1flat-fielded}$, $\overline{E}_{X2flat-fielded}$, $\overline{E}_{Yflat-fielded}$, $\overline{E}_{Zflat-fielded}$ are total or average spectrally weighted irradiance on a subset of pixels of the array of detectors.

6. The color calibration method according to claim 1, wherein the step of selecting an array of detectors of optical radiation further comprising the step of selecting a charge coupled device.

7. The color calibration method according to claim 1, wherein the step of selecting an array of detectors of optical radiation further comprises the step of selecting a CMOS device.

8. The color calibration method according to claim 4, further comprising a step of obtaining tristimulus values **X1**, **X2**, **Y** and **Z** for the imaging color measurement device by multiplying the total or average spectrally weighted irradiance on a subset of pixels of the array of detectors $\overline{E}_{X1flat-fielded}$, $\overline{E}_{X2flat-fielded}$, $\overline{E}_{Yflat-fielded}$, $\overline{E}_{Zflat-fielded}$ for each of the color filters with the corresponding color correction coefficient C_{X1}, C_{X2}, C_Y and C_Z, respectively.

9. The color calibration method according to claim 1, wherein the imaging color measurement device includes an array of pixels, such that:

the error correction matrix for each instance of irradiation of the array of detectors in a single color measurement is in a form of a flat-fielding correction matrix;

the irradiance response for each of the color filters is in a form of a irradiance response matrix; and

the flat-fielded spectrally weighted irradiance response for each of the color filters is in a form of a flat-fielded spectrally weighted irradiance response matrix.

10. A color calibration method, comprising performing a flat-fielding step and utilizing a flat-fielding correction matrix obtained from the flat-fielding step to correct an irradiation response matrix or matrices measured during color calibration.

11. A color calibration method, comprising:

providing an imaging color measurement device able to measure a plurality of light emitting areas at once;

flat fielding the imaging color measurement device;

color calibrating the imaging color measurement device, further comprising the following steps:

measuring an illuminant light source with known spectral response or chromaticity coordinates to obtain a flat-fielded irradiance response and an average flat-fielded irradiance response;

calculating one or more color correction coefficients for the imaging color measurement device according to the known chromaticity coordinates of the illuminant light source, the

flat-fielded irradiance response, and the average flat-fielded irradiance response; and

obtaining trismulus values of the imaging color measurement device by multiplying the flat-fielded irradiance response with the color correction coefficient.

12. The color calibration method according to claim 11, wherein the flat-fielding step is performed prior to the step of calculating a color correction coefficient of the imaging color measurement.

13. The color calibration method according to claim 11, further comprising using a plurality of color filters to measure the illuminant light source.

14. The color calibration method according to claim 13, wherein the imaging color measurement device is flat fielded for each of the color filters.

15. The color calibration method according to claim 13, wherein the step of obtaining the color correction coefficient includes calculating the color correction coefficient for each of the color filters.